

12. $\int_1^5 x^2 dx$

Riemann Sum

$x_0 = 1$
 $x_1 = 1 + \frac{4}{n}$
 $x_2 = 1 + 2 \cdot \frac{4}{n}$
 $x_3 = 1 + 3 \cdot \frac{4}{n}$
 \vdots
 $x_k = 1 + k \cdot \frac{4}{n}$

$\Delta x = \frac{5-1}{n} = \frac{4}{n}$

$\int_a^b f(x) dx = \lim_{n \rightarrow \infty} \sum_{k=1}^n f(x_k) \Delta x$

$= \lim_{n \rightarrow \infty} \sum_{k=1}^n \left(1 + k \cdot \frac{4}{n}\right)^2 \frac{4}{n}$

Feb 21-10:33 AM

$f(3) + \int_3^4 f'(x) dx = f(4)$

$f(-3) = - \int_{-3}^4 f'(x) dx + f(4)$

$f(-3) = \int_4^{-3} f'(x) dx + f(4)$

Feb 21-12:01 PM

Review 2 continuity

Continuous - no holes, gaps, VA, jumps

draw graph without lifting pencil off paper

$f(x)$ is continuous at a point $x=a$

1. $\lim_{x \rightarrow a} f(x)$ exists
2. $f(a)$ exists
3. $\lim_{x \rightarrow a} f(x) = f(a)$

$f(x)$ is continuous on an interval means $f(x)$ is continuous at every point in the interval

Feb 21-12:04 PM

Is $f(x) = \frac{1}{x}$ continuous at $x=0$? No

$f(0)$ dne $\lim_{x \rightarrow 0} \frac{1}{x} = \pm \infty$ dne

Is $f(x) = \frac{1}{x}$ continuous at $x=1$?

$\lim_{x \rightarrow 1} \frac{1}{x} = 1$
 $f(1) = 1$

Is $f(x) = \frac{1}{x}$ continuous on $(-\infty, \infty)$?

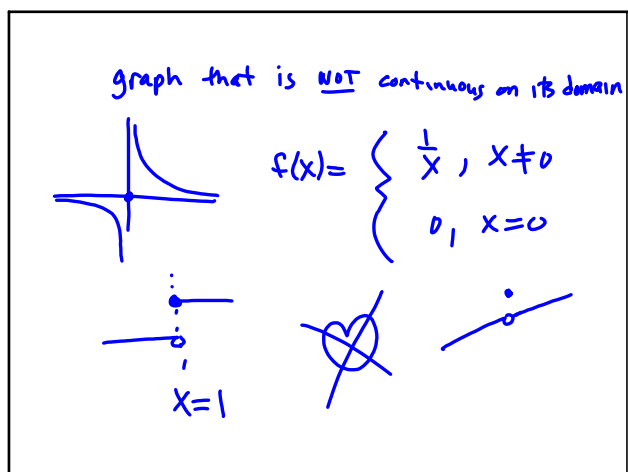
discontinuous at $x=0$

Is $f(x) = \frac{1}{x}$ continuous on its domain?

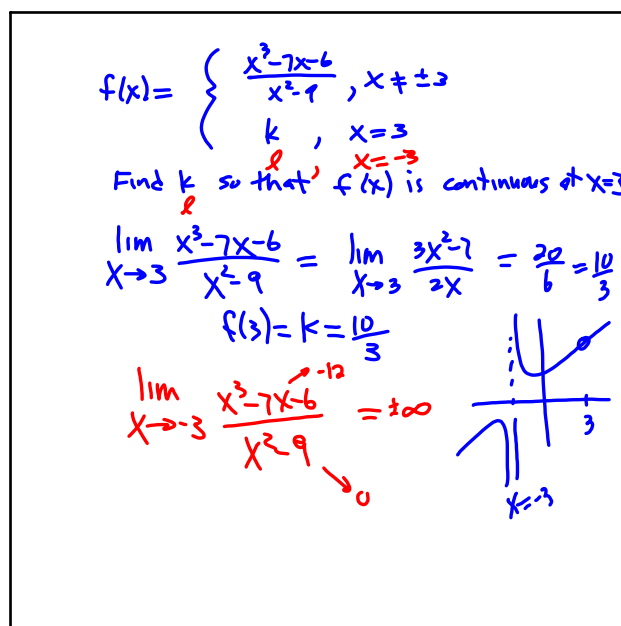
Yes because $x=0$ is not in the domain

Is $f(x) = \frac{1}{x}$ continuous?

Feb 21-12:14 PM



Feb 21-12:22 PM



Feb 21-12:26 PM